

Comprehensive Guide to VLAN Configuration - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

This document serves as the definitive technical reference for the Advanced VLAN Configuration Engine, a carrier-grade hardware and software subsystem designed for dynamic, high-density virtual local area network (VLAN) provisioning. The solution addresses the critical requirements of modern multi-tenant data centers, enterprise campus networks, and service provider edge infrastructures. By integrating hardware-based VLAN tagging, filtering, and translation capabilities, this platform ensures deterministic performance and robust security isolation across thousands of concurrent broadcast domains. This datasheet provides comprehensive details on system architecture, hardware specifications, compliance standards, and ordering information.



ARCHITECTURE & CHASSIS DESIGN

The system is engineered around a modular, high-availability chassis architecture that supports up to 4 line cards and dual redundant supervisor engines. The backplane implements a non-blocking, high-speed fabric with a total switching capacity of up to 3.2 Tbps, ensuring wire-speed performance for all VLAN operations. The design prioritizes flexibility through a range of interface modules, including 10/25/40/100 Gigabit Ethernet ports, each capable of supporting IEEE 802.1Q VLAN tagging, QinQ (802.1ad), and Private VLAN (PVLAN) configurations. The data plane is powered by a custom ASIC with an integrated Ternary Content-Addressable Memory (TCAM) that enables advanced VLAN-based access control lists (VACLs) and quality of service (QoS) marking without compromising line-rate forwarding.

HARDWARE FEATURES

The platform supports up to 4096 active VLANs, compliant with the IEEE 802.1Q standard, with the ability to manage up to 1,000,000 VLAN instances via dynamic MPLS or VXLAN overlays. A key differentiator is the hardware-assisted VLAN Translation and Mapping, which allows seamless interoperability between different VLAN domains, making it ideal for data center interconnects (DCI) and multi-tenant environments. The system includes comprehensive Layer 2 protocol management, supporting GARP VLAN Registration Protocol (GVRP), Multiple VLAN Registration Protocol (MVRP), and Multiple Spanning Tree Protocol (MSTP) to prevent loops and ensure high availability. Additionally, the hardware is designed with energy efficiency in mind, featuring field-replaceable fan trays and 1+1 redundant power supplies (AC or DC).

COMPLIANCE & STANDARDS

This system has been rigorously tested and verified to comply with a wide range of industry standards and certifications. It fully conforms to IEEE 802.1Q, 802.1ad (QinQ), 802.1v (VLAN Classification), and 802.1ak (MVRP). For security and interoperability, it adheres to the MEF 10.3 and MEF 45 Carrier Ethernet standards. The hardware has received CE, FCC, and UL approvals, ensuring it meets electromagnetic compatibility and safety requirements for global

deployment. It also meets the rigorous Telcordia GR-1089-CORE (Electromagnetic Compatibility) and GR-63-CORE (NEBS Level 3) standards, making it suitable for both enterprise data centers and central office installations.

TECHNICAL SPECIFICATIONS

Parameter	Specification
Form Factor	Modular 4RU Chassis, 19-inch Rack-Mountable
Switching Capacity	3.2 Tbps (Full Duplex, Non-Blocking)
VLAN Support	Up to 4096 Active VLANs (802.1Q), 1M+ via Overlays
Forwarding Rate	2.4 Bpps (Billion Packets per Second)
Power Supply	1+1 Redundant, Hot-Swappable AC/DC (100-240V AC / -48V DC)
Typical Power Consumption	850W (Base Configuration)
Operating Temperature	0°C to 40°C (32°F to 104°F)
MTBF	> 250,000 Hours

ORDERING OPTIONS

The platform is available in multiple configurations to suit a variety of network scales and redundancy requirements. The base unit (SKU: VLAN-4000-C) includes a single supervisor engine, one power supply unit (AC), and a chassis with 4 line card slots. For high-availability deployments, the fully redundant option (SKU: VLAN-4000-HA) includes dual supervisor engines, two AC power supplies, and enhanced fan trays. A variety of line cards are offered separately, categorized by port density and speed: 48x10G SFP+ (SKU: L10G-48), 24x25G SFP28 (SKU: L25G-24), and 8x100G QSFP28 (SKU: L100G-8). A comprehensive software license tier is also available, unlocking advanced features such as VXLAN to VLAN mapping, EVPN support, and telemetry data streaming.

